was conferred at Ferrara, May 31, 1503. He sought no diploma at Padua, though he studied medicine there during the four years of his *second* stay in Italy. The assertion that at the age of twenty-seven he was summoned to profess mathematics at Rome is inexact. Uninvited, so far as is known, he repaired thither with his brother early in the year of jubilee (1500); and delivered unofficially some brilliantly-attended lectures during the ensuing winter. Finally, he settled down to his life's work at Frauenburg, not in 1510, but in 1512.

One rubs one's eyes in amazement to find Basil Montagu's discredited and superseded edition quoted as the best and completest of Bacon's Works. Is it really possible that the news of the late Mr. Spedding's labours has not yet reached Chantilly? It would appear not; for his name is unmentioned by M. Marie, who equally overlooks Mr. Fowler's instructive edition of the "Novum Organum."

In the date assigned for Robert Hooke's death, he copies an error of Poggendorff's, who states that he died at the age of eighty-seven, whereas he did not live to complete his sixty-eighth year. The substitution of 1722 for 1703 is of more than simply formal importance, since the publication of Newton's "Optics" and his acceptance of the Presidentship of the Royal Society, both depended upon the event thus post-dated. Newton loathed controversies, although drawn into many. But while Hooke lived, they could only be avoided by self-effacement; and this was accordingly the policy adopted, as far as possible, by his great rival.

M. Marie makes no secret of his aversion to the sour little professor of Gresham College; and it is too true that his character repels sympathy, while his achievements were not of the dazzling sort to blind men to his failings. Still, his claim to due recognition remains intact, although ignored by our author, who states openly that only Poggendorff's eulogies, by "forcing his hand," frustrated his intention of punishing his egotism with neglect. Yet Hooke, by Newton's express admission, discovered independently the law of inverse squares, and it is not too much to say that, but for his incitements, Newton would not have undertaken the investigation which led to his immortal discoveries.

M. Marie's grudge against Hooke does not seriously detract from the value of his work; but it is otherwise with his ill-will towards Newton. Not only is he avowedly the partisan of Leibnitz in the never-ending debate concerning the invention of the Calculus; but his dislike (not wholly unjustifiable) to Newton's conduct in the matter extends to all the processes of his mind. He compels himself, it is true, to utter a few obligatory words in acknowledgment of the greatness of his work; but its entire significance seems to escape him. His readers are only quite casually reminded that the discovery of the system of the world was of greater moment in the history of science than the solution of the problems of the brachystochrone, or of the centre of oscillation.

We are told by M. Marie that Newton represented his University in Parliament from 1688 until 1705, during which time he was assiduous in his attendance, but spoke once only, to request the usher to shut a window (t. v. p. 170). In fact he sat three (1689-90, and again 1703-5), not seventeen, years. At p. 162 of the same volume we meet the surprising statement that Halley predicted for 1682 the return of the comet observed by Kepler in 1607. It is almost superfluous to remark that its appearance in 1682 was as unlooked-for as that of any of its predecessors, that its periodical character was then first divined, and in 1759 verified.

The observation made by Wilcke in 1787 that the auroral corona forms in the magnetic zenith is attributed by our author to De Mairan in 1747. The eminent Academician, we can assure him, would have been the last to welcome a remark so subversive of the arguments by which he sought to efface the magnetic character of the phenomenon. Neither is it the case that Halley noticed the bisection of the auroral arch by the magnetic meridian. Obvious though the coincidence appear, it was first pointed out by Ussher in 1788.

We note further M. Marie's curious incredulity as to the authentic measurement, so far, of the parallax of any single star; his statements that the accepted value of the solar parallax is 8″·5 (t. ix. p. 43), that the mass of the moon is $\frac{1}{88}$ that of the earth, and that Herschel detected interstitial movements in resolvable nebulæ (t. ix. p. 145); finally, his ascription to Sir *William* Herschel of the translation of Lacroix' "Differential Calculus" executed by his son conjointly with Babbage and Peacock.

These and other similar blemishes, however, are very far outweighed by the merits of the work in which they occur. It is one of marked individuality; and individuality lends interest, if it sometimes begets defects. No student of the higher mathematics should leave it unread; its perusal cannot fail to afford pleasure, as well as to widen comprehension of modern methods by their comparison with those they have succeeded, and by the intelligent survey of their growth in the past.

CHEMISTRY OF WHEAT, FLOUR, AND BREAD

Chemistry of Wheat, Flour, and Bread, and Technology of Bread-making. By William Jago. (Brighton: Published by the Author, 1886.)

THIS bulky volume professes to treat of its subjects in an exhaustive manner. Wheat, flour, and bread-making are as important as they are universal; and if they are common-place, their study requires deep insight into chemical science. Mr. Jago's book will form a valuable addition to economic science. The composition of wheats from all parts of the world, the minute structure of the grain, the composition of milling products, and the processes of panary fermentation, fall properly within the limits of such a work, and are dealt with in an exceedingly painstaking manner. The various methods of bread-making, the chemistry of the art, and the effects of blending different descriptions of wheat so as to secure the best possible results, are amply and ably discussed. Modern milling and baking appliances are also described carefully and illustrated graphically. There is likewise enough of the author's own thought and research to redeem the work from the stigma of being mere compilation. The book is decidedly useful, and, making due allowance for the progressive state of our knowledge upon many of the topics dealt with, it will probably be received as a standard work. It brings within its ample limits a vast amount of information which has usually, and we think appropriately, been treated of by separate authorities. The book is, in fact, a sort of encyclopædia of bread-making, and this being the case, it is open to the faults of such works. The design or scope is too large, and the matter introduced to our notice is often too remotely relevant to the immediate wants of the reader. A definition of chemistry, a table of atomic weights, an explanation of chemical equations, atoms and molecules, are scarcely necessary in this connection. Similarly, we cannot approve of lessons upon polarisation of light, the uses of the microscope, and the *camera lucida* being introduced *in extenso* into a book specially treating of a technical subject like this. Such knowledge ought to be assumed as already possessed by the reader; and as well might the author have given instruction upon the origin and uses of decimal fractions, or led up to his subject by several preliminary volumes dealing with the whole "circle of the sciences." Certainly he lays himself open to the charge of instructing either too much or too little. He deals with abstract scientific problems lying at the root of chemistry, and with the vulgar processes of the cook and the baker; and treats with equal facility of the microscope and the flour-mill. We had rather leave the minuter criticism of this voluminous work to the many experts whom it concerns, and who will no doubt be ready to detect any errors into which the indefatigable and talented author may have fallen. If Mr. Jago is ever tempted to bring out a second edition, we may recommend the use of the pruning-knife, which, if judiciously and freely used, will leave a better proportioned but less bulky treatise in our hands.

JOHN WRIGHTSON

OUR BOOK SHELF

American Journal of Mathematics, vol. viii. No. 3. (Baltimore, July 1886.)

IN her note on "the binomial equation $x^p - 1 = 0$," Miss Scott gives a somewhat simpler form of the equation for quartisection than that given by Prof. Cayley (*L.Math. S.Proc.*, vol. xi. pp. 11-14), and works out the equation for quinquisection on apparently different lines from Mr. F. S. Carey's solution (cf. Prof. Cayley, *L.Math.S.Proc.*, vol. xii. and vol. xvi.). Mr. F. N. Cole furnishes "A Contribution to the Theory of the General Equation of the Sixth Degree," which is interesting from the historical details which he gives. He acknowledges his great indebtedness to Klein, but there is a good deal of original work in the note. Mr. J. C. Fields gives a neat "proof of the elliptic-function addition-theorem." The *pièce de résistance* of the number is, however, the long-looked-for notes of "Lectures on the Theory of Reciprocants," by Prof. Sylvester. These are designed as "a practical introduction to an enlarged theory of algebraical forms, and, as such, are not constructed with the rigorous adhesion to logical order which might be properly expected in a systematic treatise. The object of the lecturer was to rouse an interest in the subject, and in pursuit of this end he has not hesitated to state many results, by way of anticipation, which might, with stricter regard to method, have followed at a later point in the course." The lectures, which are ten in number, have been reported by Mr. J. Hammond. The subject, which, it will be remembered, was fully brought before our readers by Prof. Sylvester's inaugural lecture, printed *in extenso* in NATURE (vol. xxxiii. pp. 222-231), has already attracted many of our younger mathematicians, so that there is hope of the Professor's closing aspiration of creating "such a school of mathematics as might go some way at least to revive the old scientific renown of Oxford" being soon an accomplished fact.

The Non-Euclidian Geometry Vindicated: a Reply to Mr. Skey. (*Transactions* of Wellington Philosophical Society.)

A PAPER entitled "On the Simplest Continuous Manifoldness of Two Dimensions and of Finite Extent," by Mr. F. W. Frankland, was read before the London Mathematical Society, December 14, 1876 (*Proc.*, vol. viii. pp. 57-64), and was subsequently published in our columns (vol. xv. p. 515) This same paper, or one of similar character with identical title, appears to have given rise to a paper by Mr. Skey, which took the form of notes on Mr. Frankland's paper, and was read before the Wellington Philosophical Society on June 26, 1880 (published in the thirteenth volume of the *Transactions* of the New Zealand Institute). The pamphlet before us is an abridgment of a series of letters in which Mr. Frankland convincingly replies *seriatim* to the main points raised by Mr. Skey, and maintains his former ground by additional arguments.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

The Sense of Smell

I KNOW a person who has never been conscious of any odour from a bed of mignonette, and I know another person who has never been conscious of any odour from a bean-field. Both of these persons have the sense of smell acute and discriminating as regards other odours.

I know persons who cannot discover a difference between certain odours which are very different to ordinary persons. Then there are persons who are sickened by certain odours which usually give pleasure. A considerable number of persons seem to be altogether destitute of the sense of smell; and on the other hand there are a few who have the sense very strongly developed.

I am at present investigating peculiarities of this sense, and I shall feel obliged to any one who will furnish me with illustrations or examples—whatever their character may be—with such fullness and precision as will enable me to use them in a scientific inquiry.

ARTHUR MITCHELL

34, Drummond Place, Edinburgh, September 24

Palæolithic Implements in Cambridgeshire

FEW Palæolithic implements have, I believe, been discovered in Cambridgeshire, although they are abundant in the gravels of the neighbouring counties of Suffolk and Essex. It may therefore interest your readers to learn that three implements have lately been found near Kennet, on the surface of a field not far from the high-road from Newmarket to Thetford. Two of the implements are kite-shaped. One, of lustrous black flint, is acutely pointed, with sharp cutting edges, and has a part of the original crust of the flint left on one of the faces, which is less convex than the other. It has lost a portion of the butt-end, but is otherwise perfect. The third is a sharp-rimmed ovate implement, the surface of which is stained a deep ochreous colour. Portions of the original crust remain on the faces and base.

Two other implements of the pointed type have been found on the surface near Kennet, but are not in my possession.

In the winter of 1884-85 several implements and flakes were